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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,730	08/14/2008	Thomas Berthold	PC10910US	2816

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EXAMINER	
PARK, HYUN D	

ART UNIT	PAPER NUMBER
2857	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/593,730	BERTHOLD ET AL.	
	Examiner	Art Unit	
	HYUN PARK	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 April 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Regarding Claims 1-11. (Canceled)

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 12-17, 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Milliken et al., "Race car Vehicle Dynamics," (1995) (hereinafter Milliken) in view of Ono et al., US-PGPUB 2004/0133330 (hereinafter Ono).

Regarding Claim 12. Milliken discloses calculating the lateral force in a motor

vehicle with an electromechanical or electrohydraulic steering system, the method comprising:

calculating a total restoring torque from the steering rod force by a calculation unit of the vehicle, with the said total restoring torque comprising a restoring torque generated by lateral force and other restoring torques, quantitatively determining, by the calculation unit of the vehicle, the other restoring torques based on measured values, subtracting the other restoring torques from the total restoring torque for determining the restoring torque generated by the lateral force by the calculation unit of the vehicle, and determining the lateral force from the restoring torque generated by the lateral force by the calculation unit of the vehicle (*Section 2.11, Torque About the wheel Spin Axis, pgs. 74-75), other restoring torques that includes Mz, which is the Aligning torque due to inclination angle, and Fy is the lateral force)*; *Section 2.10, pgs. 69-75; Section 2.2, section Mechanical Trail, Pneumatic trail and steering torques, pgs. 28-31; section 2.5, section Aligning torque due to camber, pg 27*) Since the torque equation is given, it would have been obvious to a person of ordinary skill in the art to subtract the other restoring torques from the total restoring torque for determining the restoring torque generated by the lateral force by the calculation unit of the vehicle, and determine the lateral force from the restoring torque generated by the lateral force by the calculation unit of the vehicle, since it only involves rearranging the well known equation, and only requires routine skill in the art.

Milliken does not disclose recording a steering rod force.

Ono disclose self-aligning torque calculating apparatus, which consists of the steering torque (or force) detection portion, which is used to accurately determine one of the parameter (namely the surface friction state) related to the stability of the vehicle (*Fig. 2; **21**; Paragraph [0007]).*

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use Ono's teaching in Smith to *accurately* record the steering torque (or force), as taught by Ono, so as to accurately calculate the lateral force for the purpose of the optimal vehicle stability and control.

Regarding Claim 13. Milliken discloses a steering rod force (or torque) and the total restoring torque is included in the determination of the lateral force (*pg. 75; Tin is the steering force (or torque) and the torque on the right side is the total restoring torque; Fy is the lateral force, Mz is the aligning torque, which can also be used to determine the lateral force from the pneumatic trail relationship*). Although Milliken does not disclose a transmission ratio between the steering rod force and the total restoring torque is included in the determination of the lateral force, it would have been obvious to a person of ordinary skill in the art to divide the steering rod force (or torque) by the total restoring torque to get the said ratio, since such mathematical representation is another

common way to represent a relationship between two sets of parameters by a constant (or ratio), and only requires routine skill in the art.

Regarding Claim 14. Milliken discloses the transmission ratio is responsive to a steering angle (*pg. 267, 4th and 5th paragraphs; pg. 149, The Derivative Notation section, 2nd paragraph, where the lateral force and yawing moment are linear functions of steering angle δ. Furthermore, the aligning torque due to steer is in a direction to reduce the steer angle; pg. 69, Mz: Aligning Torque*). Since the transmission ratio, wherein the denominator total aligning torque is a function of lateral force, and the lateral force is itself dependent on the steering angle, the transmission ratio is responsive to a steering angle.

Regarding Claim 15. Milliken discloses a kingpin inclination, a caster angle or a combination thereof is included in the determination of the lateral force (*pg. 30, Mechanical Trail, Pneumatic Trail and Steering Torques).*

Regarding Claim 16. Milliken discloses the other restoring torques comprise one or more of a restoring torque generated by rolling resistance, a brake force, a driving power, and a vertical force (*Section 2.11, Torque About the wheel Spin Axis, pgs. 74-75, particularly the equation shown on pages 75, where Mz is the Aligning torque, and Fy is the lateral force*)

Regarding Claim 17. Milliken discloses the steering rod force is detected as a force that acts the left and right steering tie rods or as a total steering rod force (*pg. 75; Tin the total steering rod force (or torque)).*

Regarding Claim 20. The modified Milliken does not disclose the total steering rod force is determined from the motor current and/or the motor position of one or more electric motors of the electromechanical or electrohydraulic steering system.

Ono discloses the total steering rod force is determined from the motor current and/or the motor position of one or more electric motors of the electromechanical or electrohydraulic steering system (*Fig. 2, Paragraph [0035]; Paragraph [0007]).*

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the Ono's teachings in the modified Milliken and determine the total steering rod force from the motor current and/or the motor position of one or more electric motors of the electromechanical or electrohydraulic steering system, so as to accurately record the steering torque, as taught by Ono, and thereby accurately calculate the lateral force for the purpose of optimal vehicle stability and control.

Regarding Claim 21. Milliken discloses a sideslip angle is determined from the determined lateral force (*pg. 155, Response to Applied Side Force; β is the slip angle; pg. 154, Response to Control, β/δ is the sideslip angle; pg. 25, Fig. 27*).

Regarding Claim 22. Milliken discloses a coefficient of friction is determined from the determined lateral force (*pg. 26*).

4. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Milliken, "Race Car Vehicle Dynamics," (1995) in view of Ono, US-PGPUB 2004/0133330 as applied to claim 17 above, and further in view of Uenuma et al., US Pat No. 6751539 (hereinafter Uenuma).

Regarding Claims 18 and 19. Milliken discloses steering rod force (*pg. 712, No. 1*), steering torque generated by the driver (*pg. 713, No. 4*), a steering amplification (*Power Steering, pg. 720, 3rd paragraph for the driver*), and a steering ratio (*Steering ratio, pgs. 716-719; Fig. 19.5*). Milliken also discloses steering- angle-responsive steering ratio (*pg. 716, Steering Ratio section; Figure 19.5; pg. 717, 2nd paragraph*)

Ono discloses steering torque generated by the driver (*Paragraph [0039]),* a steering amplification (*power steering; Paragraph [0033]),* and steering ratio with respect to steering force *(Paragraph [0036], lines 28-39).*

The modified Milliken does not disclose the total steering rod force is calculated from a steering torque generated by the driver, a steering amplification, and a steering ratio.

Uenuma et al. disclose calculating steering force from a steering torque generated by a driver and a steering angle (*Col. 4, lines 46-52*).

The steering- angle-responsive steering ratio is well known. As such, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the teachings of Uenuma in the modified Millliken and accurately calculate steering force from a steering torque generated by a driver, a steering amplification, and a steering angle (or steering- angle-responsive steering ratio), so as to have a vehicle steering control system that can provide accurate information on a roughness degree of road surface even when the roughness degree is small to such a degree as not induce a marked behavior of the associated motor vehicle (*Col. 2, lines 13-19*), as taught by Uenuma.

5. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Milliken et al., "Race car Vehicle Dynamics," (1995) (hereinafter Milliken) in view of Ono et al., US-PGPUB 2004/0133330, and further in view of Saib et al., US-PGPUB 2004/0024504 (hereinafter Saib).

Regarding Claim: 23. Milliken discloses the well known yaw damping with respect to lateral acceleration (*pgs. 189-190*). (*Note: Applicant also discloses checking and limiting yaw movements in the Background of the Invention section, Paragraph [0005]).*The modified Milliken does not disclose the steps of outputting the lateral force

to a dynamic control system of the vehicle that is configured to check and limit yaw movement of the vehicle based upon the lateral force.

Saib disclose the steps of outputting the lateral force to a dynamic control system of the vehicle that is configured to check and limit yaw movement of the vehicle based upon the lateral force (*Paragraph [0061*]; *Figs. 4A and B*).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the teachings of Saib in the modified Milliken and include the steps of outputting the lateral force to a said dynamic control system of the vehicle that is configured to check and limit yaw movement of the vehicle based upon the lateral force to ensure safety of the vehicle, as taught by Saib.

Response to Arguments

6. Applicant's arguments filed 04/08/2011 have been fully considered but they are not persuasive.

7. Applicant argues that the Tin is not the steering rod force or steering rod torque as it applies to Claim 12, and as such, there is no reason to combine Milliken and Ono.

In Response, the Examiner agrees that Tin is not the steering rod force or steering rod torque, as the term pertains to the wheel input driving torque, and had been incorrectly stated to be such by the Examiner. However, this is only a simple mislabeling

and explanation and does not change the equations that are used in determining the lateral force, as claimed. In the previous Office Action, the Examiner had cited portions of Milliken (*Section 2.11, Torque About the wheel Spin Axis, pgs.* ***74-75****, other restoring torques that includes* ***Mz****, which is the Aligning torque due to inclination angle, and Fy is the lateral force)*; *Section 2.10, pgs. 69-75; Section 2.2, section Mechanical Trail, Pneumatic trail and steering torques, pgs. 28-****31****; section 2.5, section Aligning torque due to camber, pg 27*), wherein the equation 2.1 on page 74 is the torque equation, with terms F_R (which contains the Tin with various terms as disclosed on page 75) and **Mz**, which has direct relation to the steering torque as disclosed on page 31. Thus by expressing **Mz** in terms of the steering torque, the lateral force from the restoring torque generated by the lateral force of the vehicle can be obtained using simple mathematical arrangement, as had stated in the rejection in the previous Office Action. As such, rejection of Milliken and Ono is valid.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HYUN PARK whose telephone number is (571)270-7922. The examiner can normally be reached on 8-4 PM, M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571)272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. P./
06/18/2011

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